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EGRET upper limits from observations of galaxy clusters Reimer et al.
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EGRET upper limits on the high-energy gamma-ray emission of galaxy clusters

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abstract

We report EGRET upper limits on the high-energy gamma-ray emission from clusters of galaxies. EGRET observations between 1991 and 2000 were analyzed at positions of 58 individual clusters from a flux-limited sample of nearby X-ray bright galaxy clusters. Subsequently, a coadded image from individual galaxy clusters has been analyzed using an adequately adapted diffuse gamma-ray foreground model. The resulting upper 2 σ limit for the average cluster is $\sim 6 \times 10^{-9}$ cm^{-2} s^{-1} for E $>$ 100 MeV. Implications of the non–detection of prominent individual clusters and of the general inability to detect the X-ray brightest galaxy clusters as a class of gamma-ray emitters are discussed. We compare our results with model predictions on the high-energy gamma-ray emission from galaxy clusters as well as with recent claims of an association between unidentified or unresolved gamma-ray sources and Abell clusters of galaxies and find these contradictory.